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| 10/537,558 | 06/03/2005 | Hans Sejr Olsen | 10341.204-US | 4697 |

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| EXAMINER |
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CHAWLA, JYOTI

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| ART UNIT | PAPER NUMBER |
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1761

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 02/22/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|--------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/537,558 | Applicant(s) OLSEN ET AL. | |
| | Examiner Jyoti Chawla | Art Unit 1761 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Amendment to the claims dated November 20, 2006 has been acknowledged. Claims 20, 23 and 28 are amended. Claims 39-45 have been added. Claims 20-45 remain pending and are examined in the application.

Claim Rejections - 35 USC § 112

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Rejections of claims 20 -38 under 35 U.S.C. 112, second paragraph, made in the office action Mailed dated May 18, 2006 have been withdrawn in light of applicant's amendments.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Rejections of claims 20-24, 28-30, 32-33, 35-38 under 35 U.S.C. 102 (b) made in the office action Mailed dated May 18, 2006 have been withdrawn in light of applicant's amendments.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(1) **Claims 20-24, 28-30, 32-33, 35-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahvenainen et al (US5273762), hereinafter Ahvenainen in view of Muller (US 2592170).

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Regarding **claim 20**, Ahvenainen teaches a method for the fermentation of beer and intermediate products thereof. Ahvenainen teaches a process of treating barley to make beer or barley syrup. The reference teaches the claimed steps as discussed below:

- (a) forming a grist comprising grain (Column 1, lines 28-30);
- (b) forming a mash comprising the grist from step (a) (Column 1, lines 28-32);
- (c) liquefying the mash in a step comprising jet-cooking in the presence of exogenously supplied alpha-amylase (Column 5, lines 58-65);
- (d) saccharifying the liquefied mash in the presence of exogenously supplied glucoamylase (Column 2, lines 5-8 and Column 6, lines 1-5);
- (e) fermenting the mash with yeast (Column 1, lines 35-40 and Column 2, lines 15-20); wherein the step (e) is performed after step (d) (Column 1, lines 35-40).

Ahvenainen teaches the above listed steps in the process recited in claim 20. The reference teaches addition of hops to the wort, however, it does not teach the addition of hops to the mash prior to or during cooking of mash as recited in step (c) of amended claim 20. However, addition of hops or hop extracts at various stages during the beer making process has been known in the art. Muller teaches the addition of hops to the mash before cooking process (column 1, lines 5-30 and Column 3, lines 5-50). The reference teaches that hops are added to the mash prior to cooking to provide hop enzymes that help in coagulation of albuminoids from malt. These albuminoids serve as food for the yeast and also for the stability of the foam of the beer thus produced (column 1, lines 5-30 and Column 3, lines 5-51).

Thus hops have been a known source of flavor and taste to the beer and are generally added to the wort (Ahvenainen). However, addition of hops earlier during mashing has also been known in the art as a beneficial step (Muller).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ahvenainen and add hops to the mash either prior to or during the cooking of mash in order to coagulate albuminoids, which help to stabilize beer foam. One would have been further motivated to do so in order to provide additional nutrient source for the yeast and promote a faster fermentation process.

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Regarding **claim 36 -38**, Ahvenainen in view of Muller teaches wort produced by the process recited by the applicant in claim 20 (Column 1, lines 20-40 and Column 5, lines 50-65).

Regarding **claim 37**, the applicant defines "wort" as the "unfermented liquor following extraction of the grist during mashing " and also defines " a malt extract derived from a wort produced by the process the first aspect " i.e., (Claim 20 steps prior to fermentation). Based on this description since Ahvenainen in view of Muller teaches the process recited by the applicant in claim 20, the references also teach malt extract produced by the process of claim 20.

Regarding **claim 38**, Since Ahvenainen in view of Muller teaches all the steps of claim 20 as recited by the applicant therefore, the references also teach a beer produced by the process of claim 20.

Regarding **claim 21**, Ahvenainen teaches the grist comprising grain from which hull has been removed (Column 4, lines 5-10) as recited.

Regarding **claim 22**, Ahvenainen teaches, the liquefaction step (c) where
(c1) jet-cooking the mash at a temperature of 100°C, which falls between applicant's recited range of 85-140°C. (Column 5, lines 55-65);
(c2) holding the mash at a temperature of 85°C, which falls between applicant's recited range 55-95°C. (Column 5, lines 55-65);
and step (c1) and/or step (c2) are carried out in the presence of an alpha-amylase (Column 5, lines 60-64).

Regarding **claim 23**, Ahvenainen teaches the saccharification step (d) and/or the fermentation step (e) is carried out in the presence of alpha-amylase (Column 5, lines 60-64), beta-amylase (Column 5, line 65 to Column 6, line 10), cellulase (Column 5, lines 60-64), pentosanase and protease (Column 1, lines 28-30).

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Regarding **claim 24**, Ahvenainen teaches addition of cellulase to the mash to improve filterability after saccharification (Column 2, lines 1-25), cellulase is a cell wall degrading enzyme, and therefore it would degrade yeast cell wall too. Therefore, Ahvenainen teaches a yeast cell wall degrading enzyme.

Regarding **claim 28, 39-45**, Ahvenainen teaches barley, maize and rice (grain) to make grist (Column 1, lines 20-50). Although the reference does not specify the percentage of each of the sources of grist, however, grains are the only source of grist described in the reference, thus the reference teaches all grist to come from grains as recited by the applicant in the claims listed above

Regarding **claim 29**, Ahvenainen teaches the grist comprises malted grain (Column 1, lines 28-30).

Regarding **claim 30**, Ahvenainen teaches wherein the grist comprises malted barley (Column 1, lines 28-30) as recited.

Regarding **claim 32**, Ahvenainen teaches addition of hops to the wort, however, it does not teach the addition of hops to the mash prior to or during cooking of mash as recited in step (c) of amended claim 20. However, addition of hops or hop extracts at various stages during the beer making process has been known in the art. Muller teaches the addition of hops to the mash before cooking process (column 1, lines 5-30 and Column 3, lines 5-50). The reference teaches that hops are added to the mash prior to cooking to provide hop enzymes that help in coagulation of albuminoids from malt. These albuminoids serve as food for the yeast and also for the stability of the foam of the beer thus produced (column 1, lines 5-30 and Column 3, lines 5-51).

Thus hops have been a known source of flavor and taste to the beer and are generally added to the wort (Ahvenainen). However, addition of hops earlier during mashing has also been known in the art as a beneficial step (Muller).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ahvenainen and add hops to the mash either prior to or during the

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cooking of mash in order to coagulate albuminoids, which help to stabilize beer foam. One would have been further motivated to do so in order to provide additional nutrient source for the yeast and promote a faster fermentation process. (Column 1, lines 30-40, Column 6 lines 40-50).

Regarding **claim 33**, Ahvenainen teaches, wherein hops are added to the mash prior to the fermentation step (e) (Column 1, lines 28-40, Column 6 lines 40-50).

Regarding **claim 35**, Ahvenainen teaches process of making beer, which can be any kind of beer. However, Ahvenainen specifically teaches lager as he uses bottom-fermenting yeast (Column 5, lines 25-30).

(2) Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Ahvenainen in view of Muller (US 2592170), as applied to claims 20-24, 28-30, 32-33, 35-45 above, and further in view of Villetaz (US 4439455).

Ahvenainen in view of Muller has been relied on to reject claims 20-24, as discussed above.

Regarding claims 24-26, Ahvenainen teaches the addition of cellulase as discussed above, but is silent as to the source of cellulase or the specific nature of cellulase. However, Villetaz teaches enzymatic treatment of alcoholic beverages especially yeast infected grape beverages, with an enzyme (fungal/ yeast cell wall degrading enzyme) preparation derived from *Trichoderma harzianum* and the enzyme produced is primarily alpha-1, 3-glucanase. However, both alpha and beta glucanases have been produced by *Trichoderma harzianum* (Abstract and Column 1, line 65 to column 2, line 30 and Column 3, lines 1-10). The glucanases produced by *Trichoderma harzianum* breakdown the beta glucan from the fungal/ yeast cell wall and make must filtering easier by breaking down 1, 3-beta glucan and 1,6- beta side chains of the cell wall (Column 1, lines 35-45). Therefore it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Ahvenainen and add the yeast cell wall degrading enzyme produced by *Trichoderma harzianum* as taught by Villetaz to breakdown the

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glucan and improve the filterability and yield of resulting fermented beverage, i.e., beer. It would have been obvious to choose *Trichoderma harzianum* as the source of enzyme as there are commercially available cell wall degrading enzyme preparations that have been obtained from *Trichoderma harzianum* e.g., by NovoNordisk Denmark.

(3) Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Ahvenainen in view of Muller as applied to claims 20-24, 28-30, 32-33, 35-45 above, and further in view of Godtfredsen et al (US4708875), hereinafter Godtfredsen.

Ahvenainen in view of Muller has been relied on to reject claims 20-24, 28-30, 32-33 and 35-45 as discussed above.

Ahvenainen is silent regarding claim 27, however Godtfredsen teaches addition of acetolactate decarboxylase during or after the fermentation step (Abstract) to produce fermented alcoholic beverages like beer with low diacetyl (foul smelling compound) content. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Ahvenainen and add acetolactate decarboxylase enzyme to the mash during or after fermentation as taught by Godtfredsen to avoid strong undesirable smell of diacetyl in the beer (Column 3, lines 30-35) and also to shorten the maturation or secondary fermentation process of making an alcoholic beverage like beer.

(4) Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Ahvenainen in view of Muller, as applied to claims 20-24, 28-30, 32-33, 35-45 above, and further in view of Brenner et al (US 3795745), hereinafter Brenner.

Ahvenainen in view of Muller has been relied on to reject claims 20-24, 28-30, 32-33 and 35-45 as discussed above.

Regarding claim 31, Ahvenainen teaches grist grain is milled (Column 4, lines 10-15). However, Ahvenainen does not teach dry-milling the grain. Dry milling of grain is well known in the art and Brenner teaches grinding or milling the grain dry, where the grains

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are steeped subsequently to being ground, granulated or comminuted to allow for a thorough penetration of the enzymes into the interior of the grains during the mashing process (Column 8, lines 42-60). Therefore it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Ahvenainen, based on the teachings from Brenner and use dry milled grain because dry milling gives more control over the grinding process and the particle size can be made extremely fine if desired. Fine ground grain can be digested faster and better by the enzymes in the mash.

(5) Claims 32- 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Ahvenainen, as applied to claims 20-24, 28-30, 32-33, 35-45 above, and further in view of combination of Goldstein et al (US5972411), hereinafter Goldstein.

Ahvenainen in view of Muller has been relied on to reject claims 20-24, as discussed above.

Regarding claims 32 –34, Ahvenainen in view of Muller teaches addition of hops prior to cooking step, as discussed above. However, Ahvenainen does not teach addition of hops just prior to fermentation or after the fermentation step. Addition of hops at different steps during the process of brewing is well known and Goldstein teaches addition of hops before cooking "Kettle Hop" and after fermentation "Dry Hopping" (Column 1, lines 30-50). Goldstein also teaches making of a kettle hop flavor compound that can be added to beer prior to fermentation to obtain the desired hop flavor (column 3, lines 35-45). Addition of hops to beer at various steps (cooking, before and after fermentation) gives different hop flavors to the finished fermented product. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Ahvenainen as taught by Goldstein and add hops at different steps, i.e., during cooking, before and after fermentation, because it would give the brewer a greater number of products with different flavors and aroma characteristics by using the same basic process of beer preparation. The versatility of adding hops at different steps would also be cost effective for the brewer as different batches brewed can yield different products without the need for additional equipment.

Response to Arguments

Applicant's arguments filed November 20, 2006, regarding the 102(b) rejection over Ahvenainen have been fully considered and the rejection has been withdrawn in light of applicant's amendments.

Applicant's arguments regarding the references are based on the newly amended claims and the new limitations introduced into these claims. The rejections have been re-written and/or formulated with these limitations now considered and therefore, in view of these rejections, applicant's arguments are moot.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jyoti Chawla whose telephone number is (571) 272-8212. The examiner can normally be reached on 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571) 272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-

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8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jyoti Chawla
Examiner
Art Unit 1761



KEITH HENDRICKS
PRIMARY EXAMINER